Zero Retries issue 0053 2022-07-01

Zero Retries is a unique, quirky little highly independent, opinionated, self-published email newsletter about technological innovation in Amateur Radio, for a self-selecting niche audience, that's free (as in beer) to subscribe.

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

In this issue:

- **Request To Send**
- **Hamvention 2022 Closing Observations**
- **US 219-220 MHz Band**
- **Minnesota Ham Radio**
- **Zero Retries Podcast - In Development**
- **ZR > BEACON**
- **Join the *Fun* on Amateur Radio**
- **Closing The Channel**

Request To Send

You might notice that the quotes that began every previous issue of Zero Retries is gone. I'm always trying to improve Zero Retries to be more readable, and I decided to move those pithy and clever quotes to the Zero Retries About page (and did some other updates there).

To my delight, a *big* package of fun distraction arrived recently that fulfills a dream I've had since I was a kid during the Space Race and was later re-ignited with a "passion" stint during my paycheck career. More about that project in a few issues when I've had time to play with it.

To Zero Retries readers in the US, Happy Independence Day!

de Steve N8GNJ

Hamvention 2022 Closing Observations

The best part of Hamvention 2022 for me was that there were four significant conversations, only two of which I can discuss here in Zero Retries. The first was that I had a brief conversation with Matt Youngblood KD5FGE, President and CEO of FlexRadio. I (still…) owe KD5FGE a followup email on my rationale of why I think FlexRadio should be manufacturing a VHF / UHF Software Defined Radio based on FlexRadio's Amateur Radio platform. The others were fascinating and encouraging, both to me personally and about Amateur Radio's future, but they weren't on the record.

A vendor I have never seen before that I was impressed with is Phase Dock. They make a system that's vaguely Lego-like that allows you to bundle up together multiple units, with cables, into a neat looking package. For example, putting together a Raspberry Pi, a battery power unit, a display, and a radio all quickly prototyped together but able to be cleaned up into a package neat enough to do a presentation. I bought one of their starter kits, and look forward to experimenting with it.

A couple of other vendors I wish I'd taken the time to visit with are Libre Space Foundation (mostly known for their primary project, SatNOGS) and Linux in the Ham Shack podcast.

With the two year hiatus of Hamvention (and nearly every other large conference) for COVID-19, to me, it was an open question whether Hamvention would still be relevant now that we have developed good videoconferencing and virtual events such as the QSO Today Virtual Ham Expo. My answer, after attending Hamvention 2022, is that in-person events, even "personal expense" events like Hamvention, *are* still relevant because of the spontaneous, engaging conversations you can have face to face. Several people I talked to said that they didn't bother to browse the Hamvention flea market because "the good stuff is on eBay". Others said that they didn't really browse the commercial exhibits because "you can learn everything you want to know on the web".

Again, it surprised me was just how much of Hamvention 2022 was captured by professional YouTube hosts, and especially individuals capturing video and casually posting it on YouTube. I took videos on my new iPhone 13 Pro Max of much of the flea market as I experienced it, but my videos weren't anything significantly different from what others have already posted, that so I likely won't bother to edit them or post them.

The two primary categories of items that I saw in my several forays into the flea market were older radios (1940s up through the early 2000s) and surplus VHF / UHF commercial equipment, especially Motorola. It was just… astonishing… how *much* surplus Motorola gear was available in the Hamvention flea market. There were several items that I would have thought by now were unobtainable, including several of the last generation of (solid state) Rockwell Collins HF radios. I've always admired them, but $5 - 10k is outside my budget. Overall, in the portions of the flea market that I saw, there was little that was Zero Retries Interesting.

There were a number of factors cited for (my observation of) lower attendance and fewer exhibitors, including uncertainty about Hamvention 2022 being viable until only a few months before the event, the difficulty of international travel into the US, supply chain / chip shortages resulting in few new product announcements, significantly higher gas prices for those that drive

from other parts of the US, usurious hotel rates in the entire region during Hamvention weekend, and general fear about COVID-19. In my opinion, all of the above were valid reasons for lower attendance and fewer exhibitors at Hamvention 2022. It's my guess (and it's only a haphazard, inexpert *guess*) is that many of those factors won't be as prominent by Hamvention 2023 (May 19-21). COVID-19 won't be gone, of course, but we'll have another year of learning to live with it, and thus Hamvention 2023 will probably be a much livelier event than Hamvention 2022. I'm not certain I'll be able to attend Hamvention 2023, but it's quite possible that I will.

In the end, was Hamvention 2022 worth the trip (especially driving from Bellingham, Washington - roughly 2550 miles each way)? To me, yes, but I had a special circumstance. I had wanted to take a cross country vehicle trip for some time now, and May 2022 was the first time in the past decade that our personal circumstances aligned to make such a trip possible, and we really enjoyed the trip overall.

US 219-220 MHz Band

A wonky discussion about Amateur Radio spectrum allocations might not seem Zero Retries Interesting, but the US 219-220 MHz band is an exception because it's the only band allocated to US Amateur Radio that can only be used for data operations.

In the past couple of months, I've had two separate, but related conversations regarding the US Amateur Radio 219-220 MHz band with Tadd Torborg KA2DEW and Don Rotolo N2IRZ. KA2DEW had opened the discussion about 219-220 MHz during a meetup at Hamvention 2022. Apparently KA2DEW mentioned our discussion to N2IRZ, and N2IRZ and I had an extended email discussion.

The US Amateur Radio 220 MHz (1.25 meter) band used to be 220-225 MHz, but in 1988, 220-222 MHz was reallocated to commercial services. As conciliation (my word), US Amateur Radio was granted highly conditional access to 219-220 MHz. Some of the conditions include:

- Only point-to-point operations are permitted.
- If an Amateur Radio station is within 80 km of an Automated Maritime Communications System (AMTS) station, *permission* for Amateur Radio operations from that AMTS station is required.
- If an Amateur Radio station is between 80 and 640 km of an AMTS station, *notification* to that AMTS station is required.
- At least 30 days prior to operations, the ARRL (designated the national contact point for all Amateur Radio 219-220 MHz operations) must be notified.

In the 34 years since, I'm not aware of *any* Amateur Radio operations / systems operating in 219-220 MHz. That may be a result of my having lived in Washington since 1987, where there is significant commercial marine communications within Puget Sound, the Pacific Ocean, and the Columbia and other major rivers. Thus it's unlikely that permission would be granted for Amateur Radio operations in 219-220 MHz in Washington.

There was one major point that came out of my discussions with KA2DEW and N2IRZ. I stated to both of them that one of the requirements of Amateur Radio systems operating in 219-220 MHz was that Amateur Radio systems operating in 219-220 MHz must be 100 kHz radio systems. One primary reference I cited was FCC 97.303(f)(13).

> Authorized bandwidth is 100 kHz.

Not "up to" 100 kHz or "maximum bandwidth" is 100 kHz… *authorized* bandwidth is 100 kHz.

You may come to a similar conclusion after reading 15686 Federal Register / Vol. 60, No. 58 / Monday, March 27, 1995 / Rules and Regulations. Here are a few highlights from that document:

> 2. Specifically, in the Order the Commission allocated ten 100 kilohertz channels from 219 MHz to 220 MHz. Amateur operations at 219–220 MHz are authorized to operate at powers up to 50 watts (PEP) without data rate limitations.
>
> (1) Use of the 219–220 MHz segment is limited to amateur stations participating, as forwarding stations, in point-to-point fixed digital message forwarding systems, including intercity packet backbone networks. It is not available for other purposes.

And in FCC ET Docket No. 93-40, Paragraph 21 (page 4), there are these references:

> ...we find that 100 kHz channels are appropriate..."
>
> "This allocation is intended primarily for wideband operations..."

Thus, my memory of 219-220 MHz was bolstered by these references, and I remained convinced of the "requirement" that Amateur Radio operations in 219-220 MHz must use a 100 kHz radio system.

However, N2IRZ did extensive research and convinced me that there is not a *requirement* that a *219-220 MHz Amateur Radio system* **must** occupy 100 kHz.

There was a public email thread on this subject from KA2DEW titled [NinoTNC] Question about 219-220 MHz allocation dated Jun 1, 2022, 9:05 AM. Unfortunately, that email message has been deleted from Groups.io, but it was a public post, thus I feel at liberty to discuss the content of that post. The two most salient points in that email thread were:

N2IRZ wrote to Bart Jahnke W9JJ (ARRL Radiosport and Regulatory Information Manager):

> Just to be clear: you are not aware of a minimum bandwidth requirement in the 219–220 MHz segment. Is that correct?

W9JJ replied to N2IRZ:

> Correct, No Minimum Bandwidth Requirement!

Given N2IRZ's research, and W9JJ's professional opinion (again, ARRL was designated by the

FCC as the *national contact point for all Amateur Radio 219-220 MHz operations*), I re-read, and more carefully parsed the FCC regulations, and the FCC record regarding Amateur Radio operations in 219-220 MHz.

From that re-reading, I concede that N2IRZ and W9JJ are correct. There is no specific language in the FCC regulations, or the record, of a *requirement* for Amateur Radio radio systems operating in 219-220 MHz to occupy (minimum bandwidth) a 100 kHz channel. Thus, my memory / impressions turned out to be a classic mistaking of the *apparent intent* of the regulations versus the *letter* of the regulations.

(That said, I stand by my interpretation that using "100 kHz radio systems" was clearly the *intent* of the FCC regulations.)

Some historical context about the state of Amateur Radio in 1988 might be helpful at this point. In 1988, packet radio operations in Amateur Radio were growing quickly and had begun to expand to extended Packet Radio networks. It was also the case at that time that voice repeaters occupied much of the 144-148 MHz band and the 440-450 MHz band. Thus 220-225 MHz was considered an ideal band to use for packet radio linking, and the timing (for packet radio networking) of the loss of 220 - 222 MHz in 1988 was (especially) unfortunate.

The WA4DSY 56 kbps Radio Frequency (RF) Modem was announced in 1987. It operated at a data rate 56 kbps in a 100 kHz channel. The WA4DSY 56 kbps RF Modem was modular - it transmitted and received at 28 - 30 MHz, and was intended to be used with various transverters for Amateur Radio VHF and UHF bands above 220 MHz. Thus, at the time that US Amateur Radio was was given access to 219-220 MHz, "fast" data required a 100 kHz channel, and it was feasible to build fast data systems for 219-220 MHz with the use of transverters for the "220" MHz band.

Fast forward to 2022 and Amateur Radio data communications on VHF and UHF is experiencing a quiet resurgence. We now have Software Defined Radios that can easily access 219-220 MHz. Since there is no requirement that a radio occupy 100 kHz, we could be using almost any data radio system in 219-220 MHz, as long as the actual named requirements are observed. For example, and directly applicable given KA2DEW's deep involvement with TAPRN, the NinoTNC, with a maximum speed of 9600 bps, and a compatible radio occupying a 20 or 25 kHz channel, could be used in 219-220 MHz.

If I was going to attempt operations in 219-220 MHz (living in the Pacific Northwest, I won't…), my preference for 219-220 MHz would be for someone to develop a variant of the New Packet Radio (NPR) which achieves 500 kbps in a 100 kHz channel. The NPR was developed for the 420-450 MHz band, but the design is Open Source and thus it's feasible to develop a variant for 219-220 MHz. And to proactively answer an inevitable question, NPR's "500 kbps" mode is not currently compliant with an archaic FCC regulation for Amateur Radio that limits "symbol rate" at of Amateur Radio operations 219 - 450 MHz to 56k symbols per second. Thus, a slower "US compatible" mode was developed for NPR to be legally used in the US under the archaic FCC regulations.

Another approach might be to use a Software Defined Transceiver (such as the LimeSDR Mini 2.0).

To achieve reasonable power levels (up to 50 watts) on 219 - 220 MHz, the Q5 Signals 222 MHz Linear Power Amplifier seems a reasonable choice.

Concurrent with this activity, I would attempt to obtain an FCC Special Temporary Authority (STA) for STA participants to not "throttle" their (imaginary, at the moment) 219-220 MHz NPR radios, and operate them at full speed of 500 kbps.

Finally, in my opinion, deployment of systems in 219-220 MHz, and possibly developing an "NPR-125" or SDT, and a 219 - 220 MHz power amplifier, would make for a great project from a group located somewhere in the US that's at least 80 km from an AMTS station. Of course, grant funding may be available for such a project.

Minnesota Ham Radio

I follow Matt Kaskavitch K0LWC on Twitter and thus I saw mention of his new project, Minnesota Ham Radio on launch day.

> INTERESTED IN HAM RADIO? LEARN MORE ABOUT HOW YOU CAN EASILY BECOME A LICENSED HAM RADIO OPERATOR. LEARN MORE.

Unstated, but implied, of course is Interested in Ham Radio… *in Minnesota*?

That focus on Minnesota is inspired. It's a nice looking website, well curated, and not overwhelming with minutiae. It features the sorts of things new Amateur Radio Operators in Minnesota would be looking for:

- FIND A CLUB Find a Minnesota ham radio club in your local area.
- FIND A REPEATER Find a list of local repeaters where you can connect with other hams.
- FIND A NET Find an on-air net to participate in on a weekly or monthly basis.
- EVENTS Stay updated on events happening in the ham radio community across the state of Minnesota.
- RESOURCES List of tools, tips and other great ham radio websites you should have bookmarked right now.
- Minnesota Ham Radio Discord

That last one is a subtle, but defining detail. A lot of younger folks hate email (especially lists), but they love Discord. Providing a meeting place on Discord is a great, approachable way to introduce Amateur Radio.

Kudos to K0LWC!

Zero Retries Podcast - In Development

A special Zero Retries reader I talked with at Hamvention asked if I would consider creating a podcast version of Zero Retries. They would love to read Zero Retries, but their reading time is limited by a busy career and family obligations. But, they have time for audio content during commutes and bike rides. I like podcasts too for a similar reason - I can focus on a manual task like mundane office work or bench repairs and still consume intersting content. So, to answer that special Zero Retries reader (if they actually see this in text), the short answer is Yes, I'll do a podcast version of Zero Retries. I'll need to figure out the mechanics of doing so - recording, editing, publishing, etc.

I have two things going for me on this new direction. The first is that Substack now supports publishing podcasts co-equal with email newsletters. The second thing going for me is that I happen to know a podcast editor / producer in training that would love such an opportunity. So, the Zero Retries podcast may appear sooner than I would have otherwise imagined.

Recently, Substack introduced an (automatically generated) Text to Speech option in its Reader App. At the moment, Text to Speech is being enabled on selected Substack publications, so it might not be available for Zero Retries at the moment, but it's possible it will be in the future. Substack also added other audio options, including full and partial VoiceOver options inline in the newsletter.

ZR > BEACON

- **Reminder - Walmart Parking Lots on the Air (WMPLOTA) 2022** will be held on Saturday 2022-07-02 from 00:00 UTC to 23:59 UTC. *WMPLOTA [is] an event encouraging amateur radio enthusiasts to operate amateur satellites while portable in Walmart parking lots. WMPLOTA is now held annually on the first weekend in July.*

- **Reminder - Appalachian Trail Golden Packet 2022** will be held on Saturday, 2022-07-16. *The goal is to have at least two licensed amateur radio operators man each of the 15 locations along the Appalachian Trail. Many of the positions are likely to be covered by hams that have participated in the event in the past, but please do not allow that to dissuade you from signing up!*

- **KM6LYW Radio DigiPi Project** - *The DigiPi is the ultimate hot-spot for all amateur radio data modes, including APRS, ax.25, winlink email, ft8, slowscanTV, PSK31, packet and even CW. The implementation is an elegant, inexpensive, low-power, open-source Raspberry-Pi--based amateur radio data transceiver, managed exclusively by web browsers or smart-phone apps, with no bulky keyboards, monitors or complicated wiring.* I just recently became aware of this cool project which uses a Raspberry Pi Zero (or 2, or 2 W) and provides an (optional) small LCD display. There are many other Amateur Radio "hotspot" units, but (to my knowledge) those units are *only* for digital and analog voice - DigiPi is for *data*. It's an interesting project, but definitely not a *product* - see the wiring diagram and the build video. I'm going to have to try a DigiPi!
  KM6LYW also has an interesting YouTube channel.

- **FlexRadio is hiring (Amateur Radio Operators)!** *Our fast-growing organization is always looking for exceptional people to join our team. We are looking for individuals who are passionate about amateur radio and who enjoy the challenges of a rapidly-evolving ham radio market. FlexRadio is committed to developing the most talented team of professionals in the software defined radio community.*
  At the FlexRadio banquet I attended at Hamvention 2022, FlexRadio made a strong pitch for needing more engineers. They're agnostic about on-site (Austin, Texas) or remote. If I had skills they needed, they're one of the very few companies I'd consider coming out of semi-retirement to work for.

- **Progress report on the Four State QRP Group T41 5-BAND SDR TRANSCEIVER** - *The T41-EP (aka T41) is a robust 20W SSB and CW SDR transceiver, three years in the making by Jack Purdum W8TEE and Al Peter AC8GY. It is an open source project and the radio is designed to be an experimententers platform. Frequently-used settings are quickly changed using the front panel switch matrix. Other,less frequently-changed settings,are modified using a simple menu system. The settings are "set-and-forget" since they are stored in EEPROM. Software and hardware solutions can be easily be changed so experimenters can tailor the rig to meet individual needs. Jack and Al have done their best to make the radio a flexible platform to bring ideas to life and more fun, enjoyment to the hobby.*
  Another interesting project worth following! (Apologies for not remembering the person that pointed this out to me.)

- **New Pre-Release of Paclink-Open-Source** (Spotted on the Winlink site, with updates from earlier in 2022.) *Paclink-Open-Source is an open project of the Winlink Development Team intended to modernize common Winlink code and prepare for future ports to non-Windows platforms. Your participation in testing and development is invited! Join the team! These pre-releases are intended to gauge current status of the project and determine what needs to be fixed. The latest release can be downloaded from https://github.com/ARSFI/paclink-open-source/releases/ If you are interested in participating in development, please contact Moneer Salem, mooneer@gmail.com, or Lee Inman at lee@iqed.net, or use the links on the GitHub repository page at https://github.com/ARSFI/paclink-open-source.*

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur

Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*
- Pseudostaffer Dan Romanchik KB6NU for continuing to spot, and write about "Zero Retries Interesting" items on his blog that I don't spot on my own.
- Southgate Amateur Radio News consistently surfaces "Zero Retries Interesting" stories.
- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

If you're reading this issue on the web and you'd like to see Zero Retries in your email Inbox every Friday afternoon, just click:

Subscribe now

If you're a fellow smart person that uses **RSS**, there *is* an **RSS feed for Zero Retries**.

Zero Retries is on Twitter @ZeroRetries - just click:

Zero Retries on Twitter

Please tell your friends and co-conspirators about Zero Retries - just click:

Share Zero Retries

Offering **feedback or comments** for Zero Retries is equally easy; yes, you guessed it… just click:

Leave a comment

Email issues of Zero Retries are "instrumented" by Substack to gather basic statistics about opens, clicking links, etc. I don't use such information in any way other than seeing that most subscribers actually do read Zero Retries.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted in beautiful Bellingham, Washington, USA
2022-07-01

If you'd like to reuse an article in this issue, for example for club or other newsletters, just ask. Please provide credit for the content to me and any other authors.

All excerpts from other authors or organizations, including images, are intended to be fair use.

Portions Copyright © 2021-2022 by Steven K. Stroh.

Blanket permission granted for TAPR to use any Steve Stroh content for the TAPR Packet Status Register (PSR) newsletter (I *owe* them from *way* back).